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Postharvest Handling Technical Bulletin

CUCUMBER

Postharvest Care and Market Preparation



Technical Bulletin No. 28

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POSTHARVEST HANDLING TECHNICAL SERIES

CUCUMBER

Postharvest Care and Market Preparation

Ministry of Fisheries, Crops and Livestock
New Guyana Marketing Corporation
National Agricultural Research Institute

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Preface

This publication is part of a series of technical bulletins that seeks to provide specific recommendations for improvements in postharvest care and market preparation for selected non-traditional agricultural products. The intended audience for this series is primarily extension agents.

Initial market assessments in current export markets and visits with producers and exporters in Guyana have shown the quality of fresh produce currently exported is uneven and in some instances very poor. Stages all along the export chain from harvest and pre-harvest to transportation and final export are all in need of improvement. Pre-harvest practices, sanitation at the packinghouse, packaging, bacterial and fungal problems, and transportation were all identified as areas where improvement could benefit the quality and increase the shelf life of Guyana's fresh produce exports. The technical bulletins address these issues specific to each product. Harvesting techniques and crop maturity indices are provided. Preparation for market, including cleaning, sorting, packing and transportation are covered. The bulletins address and recommend specific storage conditions, covering temperature and humidity controls. Finally the bulletins address postharvest diseases, and insect damage.

The undertaking of these technical bulletins is a joint effort of the Ministry of Fisheries, Crops and Livestock; the New Guyana Marketing Corporation (NGMC) and the National Agricultural Research Institute (NARI) to improve quality, increase production and promote exports. As a team, the three agencies are working on the problems, limitations, and constraints identified in the initial reconnaissance surveys, from production and postharvest handling problems, to packaging and transportation, to final market.

Introduction

Cucumber (*Cucumis sativus*) is one of the most popular salad vegetables in Guyana. It is a quick growing vine crop that produces mature fruit within 2 months after transplanting. Healthy vines will continue to produce marketable fruit for at least a 4-week period. Cucumbers are very susceptible to moisture loss and decay. Bruising and compression injury are very common when careful harvest and handling practices are not followed. Almost the entire Guyanese production volume is marketed domestically, except for small quantities that are exported to Barbados.

Harvest Maturity Indices

Cucumbers are harvested at a range of developmental stages, depending on the intended use. The time from planting until the beginning of harvest generally ranges between 55 to 60 days, depending on the cultivar and growing conditions. Cucumber fruit should be harvested at an immature stage, near full size but before the seeds are fully enlarged and become hard. The two main external indices of harvest maturity are fruit size and skin colour. The main internal indices of harvest maturity are seed development, locular jelly formation, and flesh texture.

The principal index of harvest maturity is fruit size. The proper size depends on the use and the cultivar. Fresh market slicing cucumbers should be at least 15 cm (6 in) long and firm to the touch (Figure 1).

Skin colour is another widely used index for assessing fruit maturity. The peel should be a uniform dark green colour when harvested. It should also have a noticeable wax deposit on the surface. However, some cultivars may naturally produce a lighter green fruit and environmental conditions may also affect skin colour. Fruit are generally at their highest eating quality when the skin is uniformly green. The fruit should not be allowed to turn yellow. Yellow fruit are over-mature. Fruit that are too mature have a tough leathery skin and are bitter in flavour. In the case where over-mature fruit have been inadvertently left on the vine, they should be removed as soon as possible. Old fruit left on the vine will slow flowering and the development of new fruit.



Figure 1. Ideal harvest maturity stage for cucumber

A cross sectional slice obtained from the center of the fruit can be taken to assess internal fruit maturity. At proper harvest maturity, a jelly-like material will be formed in the seed cavity. Seed development is also used to determine harvest maturity. The seeds should be uniform white in colour and immature (Figure 2). Large, slightly yellow, or hard seeds are an indication of over-maturity and low fruit quality. The fruit texture should be firm and crisp.

Harvesting should be conducted during the coolest time of the day, preferably in the morning, after the leaves and fruit have completely dried. Harvesting when the plants are wet will encourage the spread of foliar diseases. On the other hand, waiting until the heat of the afternoon to begin harvest will result in slightly softer and more flaccid fruit. The fruit generally have their highest water content at this time. The harvested cucumbers should be kept as cool as possible.

Cucumbers should be harvested every other day for best yield and quality. The cucumber fruit grows rapidly to harvest size and picking the fruit as soon as they reach marketable size will maintain the vitality and productive capacity of the plant. The fruit should be handled carefully to prevent bruising and injury to the surface.

Harvest Methods

Cucumber fruit should be carefully removed from the vine using one of two harvest techniques. The first technique involves squeezing the stem attached to the vine between the thumbnail and forefinger, followed by pulling off the fruit from the vine. This will leave a jagged stem section which will require trimming with a pruning shears or knife. The second technique, which is preferable, is to use a small knife to sever the fruit stem from the vine at a point just above the shoulder of the fruit. Done properly, the stem will not have to be re-cut during packing.

The fruit should never be torn off the vine, as this will result in damage to the vine and/or fruit. Fruit which have been pulled off the vine are often “plugged”. Plugging causes the very end of the fruit tissue to pull loose from the fruit. This is a quality defect, leaving an exposed crater of internal pulp tissue at the end of the fruit. The plugged area is an open wound which is highly susceptible to decay (Figure 3).

Cucumbers should be carefully put in a light-weight field container, either made of reed, wood, or plastic (Figure 4). If necessary, line the inside of the field container with protective padding to prevent fruit scarring and abrasion. The container should be well-ventilated and hold up to about 25 kg (55 lb) of fruit. Never put cucumbers in plastic bags or containers where air will be excluded for any period of time. Fruit kept in non-ventilated containers will lose skin colour and firmness due to a buildup of heat inside the container. Once the field container is full, it should be taken to a shaded, well-ventilated temporary holding area. Avoid leaving the fruit exposed to direct sun for more than 15



Figure 2. Uniform white-coloured seeds of cucumber fruit at optimal maturity stage.



Figure 3. Cucumbers pulled off the vine with considerable plugging of the stem end.

minutes. The cucumbers should be moved to the cleaning and packing area as soon as possible.



Figure 4. Strong, well-ventilated plastic field container ideal for cucumbers.

Preparation for Market

Cleaning

Any remaining soil in the ground spot area or other surface stains should be removed at the time of harvest. This can be done manually by rubbing the fruit surface with a soft damp cloth or cotton gloves. Washing the fruit is more efficient if the cucumbers are particularly dirty, or if the quantity of fruit is large. In this case, the fruit are submerged in a large wash tank and the surface is rubbed clean by hand or with a soft brush. The wash water should be clean and properly sanitized to reduce the potential for the spread of disease. Sodium hypochlorite (household bleach) is commonly used since it is an inexpensive and readily available wash water sanitizing agent. It is effective against decay organisms when added to the wash water at a concentration of 150 ppm and the water is maintained at a pH of 6.5. As the wash water becomes contaminated with soil and organic matter, the sanitizing ability of hypochlorous acid is diminished. Therefore, the wash water tank should be changed when necessary and filled with clean water with 150 ppm hypochlorous acid. After cleaning, the fruit is generally placed on a soft mesh or wire table to dry before sorting and grading.

Grading

Table or slicing cucumber quality is primarily based on size, uniformity of shape, firmness, and skin colour. Additional quality indices are the amount of surface blemishes and peel injury, and incidence of decay. High quality cucumber fruit should be straight, uniformly green, and have an appropriate length:diameter ratio. They should also have small seeds and a desirable flavour.

For the North American market, size is based on diameter and length. Large size cucumbers have a diameter greater than 6 cm (2 in.) and a length greater than 15 cm (6 in.). Small size cucumbers have diameters between 1.3 cm and 5 cm (0.5 in. and 2 in.) (Figure 5).

Over-mature fruit with poor colouration should not be exported (Figure 6). These fruit often have a bitter flavour and tough internal texture.



Figure 5. Small, uniform-sized and shaped cucumber fruit for export.



Figure 6. Over-mature cucumbers with a tough skin and yellow-white skin colour.

Waxing

Cucumbers are often treated with a food-grade liquid wax after grading. The purpose is to replace some of the natural wax removed during washing and cleaning, to retard water loss, and to improve appearance (Figure 7). The wax is similar to mineral oil and may be applied by hand rubbing or by roller brushes.



Figure 7. Shiny appearance of cucumbers surface after application of a liquid wax.

Packing

Cucumbers should be packed in strong, well-ventilated containers. Wooden containers which allow for stacking without collapsing are appropriate for the domestic market. Durable plastic crates are also acceptable. Mesh sacks should not be used as they provide little protection to the fruit (Figure 8).

Cucumbers for export should be packed in strong well-ventilated fiberboard cartons with a minimum test strength of 275 psi. Carton size varies depending on market destination, but typically contains 25 kg (55 lb) of fruit. If cucumbers are packed in smaller cartons they are sold by count, with 24-count being a popular size (Figure 9).



Figure 8. Mesh sacks provide little protection to the cucumber fruit.



Figure 9. Cucumbers packed in fiberboard carton (24-count) for export.

Temperature Management

The optimum temperature for storage and transport of cucumbers is 10°C (50°F). At this temperature, cucumbers can be expected to have a 2 week market life. Shriveling, yellowing, and/or decay are likely to be apparent beyond two weeks. Peel colour will start to change to yellow after about 10 days at 10°C (50°F). Storage of cucumbers below 10°C (50°F) should be avoided, as this will result in chilling injury. Holding cucumbers without refrigeration at ambient temperature will result in noticeable shriveling and decay after one week.

Relative Humidity

Although cucumbers have a waxy skin, they are susceptible to water loss during storage and marketing. Small sunken lesions may appear on the fruit surface within several days at a low relative humidity (RH). In addition, the fruit loses its firm crisp texture. A small depression at the point of stem attachment may develop. The ideal RH for holding cucumbers is 95%.

Principal Postharvest Diseases

Fungal and bacterial diseases are important sources of postharvest loss of cucumbers. Proper pre-harvest disease control practices along with careful handling to avoid tissue damage, cleaning of the fruit, proper wash water sanitation, and holding the fruit at the optimal storage temperature will minimize the development of postharvest diseases.

Alternaria Rot

Alternaria rot, caused by the fungus *Alternaria alternata*, is a common soil-borne pathogen that causes postharvest fruit rot of cucumbers. Fruit which have been stored for extended periods are more susceptible to *Alternaria*, along with fruit which have been damaged from chilling injury. Infection typically begins in injured areas or natural openings (lenticels) in the skin. Symptoms begin as circular to oval lesions on the cucumber surface that are bleached or light brown in colour. The lesions soon become

sunken and under humid conditions are rapidly covered by a dark mould. The incidence of *Alternaria* rot can be reduced by careful harvest and handling practices to prevent skin injury and storage of the fruit at 10°C (50°F).

Belly Rot

Belly rot, caused by the soil-borne fungus *Rhizoctonia solani*, is one of the most common fruit rots of cucumbers. The incidence of belly rot is significantly higher during the rainy season. Fruit initially becomes infected in the field where they contact the soil. Typical symptoms of belly rot include a dark brown water-soaked decay on the side of the fruit in contact with the soil (Figure 10), followed by a yellowish-brown discolouration of the fruit surface. Belly rot develops rapidly at ambient temperature and the entire fruit can rot within several days. Pre-harvest sprays of the fungicides azoxystrobin (Quadris), chlorothalonil (Bravo), and thiophanate-methyl (Topsin M) provide protection against belly rot infection. Holding the fruit at 10°C (50°F) will retard disease development during transit and storage.



Figure 10. Water-soaked lesions symptomatic of belly rot.

Cottony Leak

Cottony leak, caused by the soil-borne fungus *Pythium*, can cause serious losses of cucumber in Guyana. Infection occurs in the field and decay progresses rapidly after harvest. Fruit losses are greater during wet weather, especially following relatively dry weather. Wounds are not necessary for infection of the fruit. The first symptoms of cottony leak are soft, dark green, water soaked lesions or spots on the fruit surface. Later, as the fungus penetrates the fruit tissue, water is liberated in large quantities. A white, cottony fungal growth completely covers the fruit (Figure 11). The cottony growth may become flattened and matted over the fruit. Decay spreads rapidly during transit and storage, with the formation of nests of mouldy fruits exuding watery juices. The optimal temperature range for growth of the fungus which causes cottony leak is between 28°C to 37°C (82°F to 98°F). Cucumbers should be cooled to 10°C (50°F) to retard cottony leak.



Figure 11. Severe infection of cottony leak covering the cucumber fruit surface.

Rhizopus Soft Rot

Rhizopus soft rot, caused by the fungus *Rhizopus stolonifer*, is a common postharvest cucumber disease. The pathogen becomes established in wounded areas of the fruit or through the cut stem. Initially, yellowish-brown water-soaked spots form with a fairly distinct boundary. The spots are irregular in shape and develop into sunken lesions which rot. Grayish-white masses of mould develop over the wounded area, which eventually turn black. Diseased tissue is soft and very wet. High temperature and humidity and fresh wounds promote disease development.

Anthracnose

Anthracnose, caused by the fungus *Colletotrichum orbiculare*, is characterized by the formation of numerous dark circular spots on the fruit surface. The spots enlarge to form conspicuous lesions that are sunken and sometimes cracked (Figure 12). Under humid conditions, the lesions are coloured by salmon or pink spore masses. Anthracnose is usually confined to the skin, although the flesh may be invaded by secondary bacteria causing a soft rot.



Figure 12. Severe anthracnose infection of cucumber fruit.

Infection is particularly severe after prolonged wet periods. Disease development is rapid at ambient temperatures. The main ways to control anthracnose are to prevent wounding of the fruit tissue, dry wet surfaces of the fruit, and cool the fruit to 10°C (50°F) as soon as possible.

Gray Mould

Gray mould, caused by the fungus *Botrytis cinerea*, survives on plant debris in the soil and is typically found on fruit harvested during wet weather. The fungus usually enters the fruit through the blossom end. The infected area is soft, water-soaked, and yellowish; later becoming covered with a gray furry mould (Figure 13). The optimum temperature for growth of the fungus is 20°C (68°F), but substantial rotting can also occur at cooler temperatures. Good field sanitation and pre-harvest fungicide sprays will help reduce the incidence of gray mould.



Figure 13. Gray mould infection of cucumber.

Blue Mould

Blue mould is caused by various species of the *Penicillium* fungus. Symptoms include multiple small circular to oval water-soaked lesions covered with blue-green spores (Figure 14). The infected fruit have a characteristic musty odour. Some strains of the

fungus form restricted lesions, while others spread over much of the cucumber surface and cause a wet collapse. Infection is typically via wounds or directly through skin which has been weakened by chilling injury or prolonged storage. Fruit should be handled with care to minimize skin damage and stored at 10°C (50°F).

Stem-end Rot

Stem-end rot, caused by the fungus *Botryodiplodia theobromae*, can cause serious losses of cucumbers grown in warm, humid areas. Fruits are infected via wounds, including that made by cutting the stem at harvest. Symptoms include the formation of buff-coloured lesions that are spongy with a water-soaked margin. The lesions may occur anywhere on the fruit, but are frequently found at the stem end. A dark gray mould may develop on the surface of the lesions. The fungus also produces a tough layer beneath the skin of the fruit, causing it to become severely wrinkled. The fruit usually undergoes a dry rot. A sour odour usually accompanies the decay. The optimal temperature for fungal growth is 30°C (86°F). Little or no growth occurs at 10°C (50°F) and the fungus can be held in check by refrigeration.



Figure 14. Heavy infestation of blue mould on cucumber fruit.

Bacterial Soft Rot

Bacterial soft rot, caused by *Erwinia carotovora*, is the principle postharvest bacterial disease of cucumbers. It infects the fruit via cracks or wounds in the skin and often becomes established in areas infected with fungal disease. Soft rot rapidly disintegrates the flesh, turning it into a soft mass of leaky tissue. The infected cucumbers typically have a foul odour. Soft rot can be prevented by avoiding injury to the skin and always using properly sanitized (i.e. 150 ppm hypochlorous acid) wash water.

Bacterial Spot

Bacterial spot, caused by *Pseudomonas syringae*, is another common postharvest bacterial disease of cucumbers. This is the same bacteria that causes angular leafspot of the foliage. It is spread by planting contaminated seed and also disseminated in irrigation water. Infection occurs via natural openings in the fruit surface or through cracks and injuries. The bacteria may also enter the fruit through the cut stem end. Typical symptoms on the fruit surface are circular, dark green, sunken, water-soaked spots (Figure 15). The interior of the fruit may undergo a rapid soft rot along with browning of the flesh. Under warm moist conditions the disease spreads rapidly and teardrop-like exudates are released from the decayed spots. Juices from the diseased tissue may leak out and infect healthy adjacent fruit in a packed carton.



Figure 15. Bacterial spot of cucumber.

Scab

Scab, caused by the fungus *Cladosporium cucumerinum*, is a common postharvest decay that often begins prior to harvest and develops during storage. Affected fruit have large sunken lesions with water-soaked margins that later develop corky scabs (Figure 16). A thick viscous sap usually oozes through the lesions. The incidence of scab can be reduced by following good pre-harvest sanitation practices and storing the fruit at 10°C (50°F).

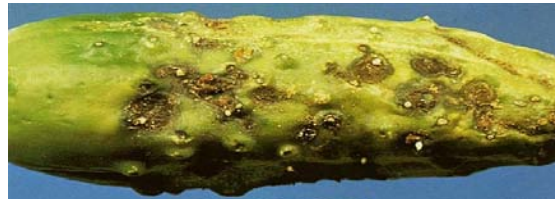


Figure 16. Scab on immature cucumber fruit.

Postharvest Disorders

Chilling Injury

Cucumbers are susceptible to chilling injury (CI) if held below 10°C (50°F) for more than several days. The amount of CI depends on temperature and the cultivar. Tissue damage becomes more severe with decreasing temperature. Symptoms of CI include tissue collapse, water-soaked spots, pitting, and accelerated decay (Figure 17).

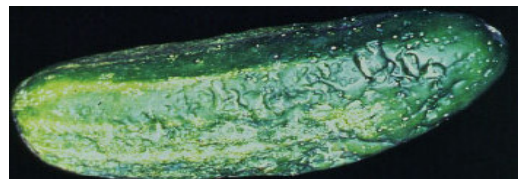


Figure 17. Severe pitting of chilling injured cucumber fruit.

Yellowing

Yellowing of the peel is a common postharvest disorder of cucumbers. This may be due to several factors, including harvesting the fruit at an advanced stage of maturity, storage at ambient temperatures for several days, or exposure of the fruit to ethylene. Yellowing and decay will result from low levels of ethylene (1 to 5 ppm) exposure during distribution and holding (Figure 18). Cucumbers should not be stored in the same location as bananas, plantains, or other high ethylene emitting products.



Figure 18. Peel yellowing is a common disorder of cucumbers exposed to ethylene.

ANNEX I

PUBLICATIONS IN THE POSTHARVEST HANDLING TECHNICAL BULLETIN SERIES

PH Bulletin No. 1	Pineapple: Postharvest Care and Market Preparation, November 2002.
PH Bulletin No. 2	Plantain: Postharvest Care and Market Preparation, June 2003.
PH Bulletin No. 3	Mango: Postharvest Care and Market Preparation, June 2003.
PH Bulletin No. 4	Bunch Covers for Improving Plantain and Banana Peel Quality, June 2003.
PH Bulletin No. 5	Papaya: Postharvest Care and Market Preparation, June 2003.
PH Bulletin No. 6	Watermelon: Postharvest Care and Market Preparation, October 2003.
PH Bulletin No. 7	Peppers: Postharvest Care and Market Preparation, October 2003.
PH Bulletin No. 8	Oranges: Postharvest Care and Market Preparation, October 2003.
PH Bulletin No. 9	Tomato: Postharvest Care and Market Preparation, October 2003.
PH Bulletin No. 10	Okra: Postharvest Care and Market Preparation, October 2003.
PH Bulletin No. 11	Pumpkin: Postharvest Care and Market Preparation, January 2004.
PH Bulletin No. 12	Lime: Postharvest Care and Market Preparation, January 2004.
PH Bulletin No. 13	Grapefruit: Postharvest Care and Market Preparation, January 2004.
PH Bulletin No. 14	Passion Fruit: Postharvest Care and Market Preparation, January 2004.
PH Bulletin No. 15	Green Onions: Postharvest Care and Market Preparation, January 2004.
PH Bulletin No. 16	Sweet Potato: Postharvest Care and Market Preparation, January 2004.
PH Bulletin No. 17	Eggplant (Boulanger): Postharvest Care and Market Preparation, January 2004.
PH Bulletin No. 18	Avocado (Pear): Postharvest Care and Market Preparation, January 2004.
PH Bulletin No. 19	Bitter Melon: Postharvest Care and Market Preparation, January 2004.
PH Bulletin No. 20	Bora: Postharvest Care and Market Preparation, April 2004.
PH Bulletin No. 21	Cassava: Postharvest Care and Market Preparation, April 2004.

PH Bulletin No. 22	Eddoes: Postharvest Care and Market Preparation, April 2004.
PH Bulletin No. 23	Ginger: Postharvest Care and Market Preparation, May 2004.
PH Bulletin No. 24	Breadfruit: Postharvest Care and Market Preparation, May 2004.
PH Bulletin No. 25	Cabbage: Postharvest Care and Market Preparation, May 2004.
PH Bulletin No. 26	Calaloo: Postharvest Care and Market Preparation, May 2004.
PH Bulletin No. 27	Coconut: Postharvest Care and Market Preparation, May 2004.
PH Bulletin No. 28	Cucumber: Postharvest Care and Market Preparation, May 2004.

OTHER PLANNED PUBLICATIONS

Lemon: Postharvest Care and Market Preparation.

Starfruit: Postharvest Care and Market Preparation.

Tangerine: Postharvest Care and Market Preparation.

Yam: Postharvest Care and Market Preparation.

Harvest Maturity Indices

Cucumbers should be harvested at an immature stage, near full size but before the seeds fully enlarge. The time from planting until the beginning of harvest generally ranges between 55 to 60 days.

The main method used to measure harvest maturity is fruit size. Fresh market slicing cucumbers should be at least 15 cm (6 in) long and firm to the touch.

Skin colour should be an even dark green with a noticeable wax deposit on the fruit surface. However, some varieties of cucumbers may naturally produce a lighter green fruit and environmental conditions may also affect skin colour. The fruit should not be allowed to turn yellow, as this is an obvious sign of over-maturity. Fruit that are too mature have a tough leathery skin and are bitter in flavour.



A cross sectional slice from the center of the fruit is used to check internal fruit maturity. A jelly-like material will be formed in the seed cavity at proper harvest maturity and the seeds should be immature and uniform white in colour. Large, slightly yellow, or hard seeds show over-maturity and low fruit quality. Fruit texture should be firm and crisp.



Cucumbers should be harvested during the coolest time of the day, if possible in the morning when fruits have their highest water content. Harvest should not begin until the leaves and fruit have completely dried to avoid the spread of diseases. Cucumbers should be harvested every other day and the fruit should be handled carefully to prevent bruising and surface injury.

Harvest Methods

The best method to harvest cucumber fruit is using a small knife to cut the fruit stem from the vine at a point just above the shoulder of the fruit. The fruit should never be pulled off the vine, as this will result in damage to the vine and/or fruit. Pulled fruit are often “plugged”, in which the tissue at the very end of the fruit remains attached to the stem, leaving an exposed crater of internal pulp tissue. The plugged area is an open wound which is highly prone to decay.

Cucumbers should be carefully put in a strong, well-ventilated field container lined with paper or padding to prevent surface scarring. The container should not be filled with more than about 25 kg (55 lb) of fruit. Never put cucumbers in plastic bags or containers where air will not be allowed to circulate. The fruit will lose skin colour and firmness due to a buildup of heat. Once the field container is full, it should be taken to a shaded holding area away from direct sun.

Preparation for Market

Cleaning

Any soil or surface stains should be removed at the time of harvest by rubbing the fruit surface with a soft damp cloth or cotton gloves. Washing the fruit may be necessary if the cucumbers are particularly dirty, or if there is a large quantity of fruit. In this case, the fruit are submerged in a wash tank and the surface is rubbed clean by hand or with a soft brush. The wash water should be clean and properly sanitized with 150 ppm hypochlorous acid (household bleach) to reduce the potential for the spread of postharvest disease organisms. This is equal to 2 oz of household bleach (such as Marvex) per 5 gallons of water, or 0.3 liters of bleach per 100 liters of water. The water in the tank should be maintained at a pH of 6.5 and changed as it becomes dirty with soil. After cleaning, the fruit should be placed on a soft mesh or wire table to dry before sorting and grading.

Grading

Grading cucumber quality is primarily based on size, evenness of shape, firmness, and skin colour. Additional quality indicators are the amount of surface damage and peel injury, and rate of

decay. High quality cucumber fruit should be straight, evenly green in colour, with a diameter greater than 5.7 cm (2.25 in) and a length greater than 15 cm (6 in). Over-mature fruit with white or yellowish colours should not be marketed, as they usually have a bitter flavour and tough texture.

Waxing

Use of a food-grade liquid wax to the cucumber surface after grading will replace some of the natural wax removed during washing and cleaning, slow water loss, and improve appearance.

Packing

Cucumbers should be packed in strong, well-ventilated containers. Wooden or durable plastic containers that can be stacked without collapsing are appropriate for the domestic market. Mesh sacks are not a good container as they provide little protection to the fruit. Use of synthetic sacks filled with more than 25 kg (55 lb) of fruit should also be avoided. Cucumbers for export should be packed in strong well-ventilated fiberboard cartons typically containing 25 kg of fruit. If cucumbers are packed in smaller cartons they are sold by count, with 24-count being a popular size.

Temperature Management

Holding cucumbers without refrigeration at ambient temperature will result in noticeable withering and decay after one week. The best temperature for storage of cucumbers is 10°C (50°F). At this temperature, cucumbers can be expected to have a 2 week market life. Storage of cucumbers below 10°C should be avoided, as this will result in chilling injury(CI). Signs of CI include tissue collapse, water-soaked spots, pitting, and decay.

Relative Humidity

Although cucumbers have a waxy skin, they are at risk to postharvest moisture loss. Small sunken spots may appear on the fruit surface within several days at a low relative humidity (RH). The ideal RH for holding cucumbers is 95%.



Principal Postharvest Diseases

Fungal and bacterial diseases are important sources of postharvest loss of cucumbers. Proper pre-harvest disease control practices along with careful harvesting and handling to avoid damage, proper wash water sanitation (150 ppm hypochlorous acid at a pH of 6.5), and appropriate temperature control (10°C or 50° F) will minimize the occurrence of postharvest diseases.

Alternaria Rot

Symptoms begin as circular type spots on the cucumber surface that are tan or light brown in colour. The spots soon become sunken and under most conditions are rapidly covered by a dark mould.

Belly Rot

Belly rot is one of the most common fruit rots of cucumbers, especially during the rainy season. Typical symptoms include a dark brown water-soaked decay on the side of the fruit in contact with the soil, followed by a yellowish-brown discolouration of the fruit surface.

Cottony Leak

The first symptoms of cottony leak are soft, dark green, water soaked spots on the fruit surface. A white, cottony fungal growth completely covers the fruit. Decay spreads rapidly during transit and storage, with the formation of nests of mouldy fruit exuding watery juices.



Rhizopus Soft Rot

At first, yellowish-brown water-soaked spots form with a fairly distinct outline. The spots are irregular in shape and develop into sunken spots which rot. Grayish-white masses of mould develop over the wounded area, which eventually turn black. Diseased tissue is soft and very wet.



Anthracnose

Anthracnose is characterized by the formation of numerous dark circular spots on the fruit surface. The spots rapidly enlarge, and become sunken and sometimes cracked. Anthracnose is usually confined to the skin, but secondary bacteria causing a soft rot may invade the flesh.



Gray Mould

The fungus causing gray mould usually enters the fruit through the blossom end. The infected area is soft, water-soaked, and yellowish; later becoming covered with a gray furry mould.

Blue Mould

Blue mould symptoms include multiple small circular to oval water-soaked spots covered with blue-green spores. The infected fruit have a characteristic musty odour. Some strains of the fungus form restricted spots, while others spread over much of the cucumber surface and cause a wet collapse.

Bacterial Soft Rot

Bacterial soft rot enters the fruit via cracks or wounds in the skin and often develops in areas infected with fungal disease. Soft rot rapidly disintegrates the flesh, turning it into a soft mass of leaky tissue with a foul odour.



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With the assistance of
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New Guyana Marketing Corporation

CUCUMBERS

Postharvest Care and Market Preparation Information Sheet



This information sheet provides growers and agriculture extension personnel with a summary of the recommended harvest and postharvest handling practices for cucumbers. A more technical and detailed bulletin is available from the New Guyana Marketing Corporation (NGMC) and the National Agricultural Research Institute (NARI).